

IN THE CLAIMS

Please amend the claims as follows:

1 1 (Currently Amended). A microcavity structure comprising two or more microcavity  
2 | waveguides comprising photonic crystal structures, wherein one or more microcavity  
3 active regions are created by the overlap of said microcavity waveguides and said two  
4 or more microcavity waveguides comprise means for electrical activation.

1 2 (Original). The microcavity structure of claim 1, wherein said microcavity overlap is  
2 defined by crossing of at least two of the said microcavity waveguide at an angle.

1 3 (Original). The microcavity structure of claim 1, wherein each waveguide includes at  
2 least two optical reflectors.

1 4 (Currently Amended). The microcavity structure of claim 3 wherein the optical  
2 | reflector component ~~comprises of a variation in material refractive index in order to~~  
3 changes the direction of the incident optical energy.

1 5 (Original). The microcavity structure of claim 4 wherein the optical reflector could  
2 be, but is not restricted to, a structure with a periodic change in the refractive index  
3 such as a photonic crystal.

1 6 (Original). The microcavity structure of claim 3, wherein the optical reflectors  
2 surround the active microcavity regions.

1 7 (Currently Amended). The microcavity structure of claim 3, wherein one or more of  
2 the optical reflectors ~~are less reflective to~~ define one or more output paths of the  
3 generated light.

1 8 (Original). A microcavity structure of claim 1, wherein the microcavity waveguides  
2 provide means for material continuity to achieve the conduction of current to the active  
3 microcavity overlap regions.

1 9. (Cancelled).

1 10 (Previously Presented). The microcavity structure of claim 1 further comprising at  
2 least one contact pad that is coupled to each of the microcavity waveguides so as to  
3 apply voltage across said microcavity structures.

1 11 (Original). The microcavity structure of claim 10, wherein the top waveguide  
2 comprises p-doped material and the bottom waveguide comprises n-doped material.

1 12 (Original). The microcavity structure of claim 10, wherein the top waveguide  
2 comprises n-doped material and the bottom waveguide comprises p-doped material.

1 13 (Original). The microcavity structure of claim 1 further comprising a mechanism to  
2 provide carrier confinement in the active overlap regions by converting the material  
3 under portion of the upper waveguide into an insulator.

1 14 (Original). The microcavity structure of claim 1, wherein at least one of the  
2 microcavity waveguides comprises active material used in the generation of photons.

1 15 (Original). A microcavity structure in claim 1, wherein the active material is  
2 composed of quantum wells and/or quantum dots.

1 16 (Original). The microcavity structure of claim 1, wherein at least one of said  
2 microcavity waveguides is used to guide light.

1 17 (Currently Amended). A method of forming a microcavity structure comprising:  
2 providing two or more microcavity waveguides comprising photonic crystal  
3 structures; and

4 forming one or more microcavity active regions by overlapping said microcavity  
5 waveguides and said two or more microcavity waveguides comprise means for  
6 electrical activation.

1 18 (Original). The method of claim 17, wherein said microcavity overlap is defined by  
2 crossing of at least two of the said microcavity waveguide at an angle.

1 19 (Original). The method of claim 17, wherein each waveguide includes at least two  
2 optical reflectors.

1 20 (Currently Amended). The method of claim 19, wherein the optical reflector  
2 component ~~comprises of a variation in material refractive index in order to changes~~ the  
3 direction of the incident optical energy.

1 21 (Original). The method of claim 20, wherein the optical reflector could be, but is  
2 not restricted to, a structure with a periodic change in the refractive index such as a  
3 photonic crystal.

1 22 (Original). The method of claim 19, wherein the optical reflectors surrounds the  
2 active microcavity regions.

1 23 (Currently Amended). The method of claim 19, wherein one or more of the optical  
2 reflectors ~~are less reflective to~~ define one or more output path of the generated light.

1 24 (Original). A method of claim 17, wherein the microcavity waveguides provide  
2 means for material continuity to achieve the conduction of current to the active  
3 microcavity overlap regions.

1 25. (Cancelled)

1 26 (Previously Presented). The method of claim 17 further comprising providing at  
2 least one contact pad that is coupled to each of the microcavity waveguides so as to  
3 apply voltage across said microcavity structures.

1 27 (Previously Presented). The method of claim 17, wherein the top waveguide  
2 comprises p-doped material and said bottom waveguide comprises n-doped material.

1 28 (Previously Presented). The method of claim 17, wherein the top waveguide  
2 comprises n-doped material and the bottom waveguide comprises p-doped material.

1 29 (Original). The method of claim 17 further comprising providing a mechanism to  
2 provide carrier confinement in the active regions by converting the material under  
3 portion of the upper waveguide into an insulator.

1 30 (Original). The microcavity structure of claim 17, wherein at least one of said first  
2 and second waveguides comprises active material used in the generation of photons.

1 31 (Original). A microcavity structure in claim 17, wherein the active material is  
2 composed of quantum wells and/or quantum dots.

1 32 (Original). The microcavity structure of claim 17, wherein at least one of said first  
2 and second waveguides is used to guide light.

1 33 (Currently Amended). A microcavity structure comprising:

2 a first waveguide including a first photonic crystal microcavity comprising a  
3 first photonic crystal structure; and

4 a second waveguide including a second photonic crystal microcavity comprising  
5 a second photonic crystal structure; and

6 a microcavity active region that is created by overlapping said first and second  
7 microcavities;

8 wherein said first waveguide and second waveguide comprise means for  
9 electrical activation.

1 34 (Original). The microcavity of claim 33, wherein the photonic crystal surrounds the  
2 active microcavity region.

1 35 (Currently Amended). The microcavity structure of claim 33, wherein one or more  
2 of the photonic crystals ~~are less reflective to define~~ a single or multiple output path of  
3 the generated light.

1 36 (Original). The microcavity structure of claim 33, wherein the first and second  
2 waveguides provide means for material continuity to achieve the conduction of current  
3 to the active microcavity overlap region.

1 37. (Cancelled)

1 38 (Previously Presented). The microcavity structure of claim 33 further comprising at  
2 least one contact pad that is coupled to said first waveguide and at least one contact pad  
3 that is coupled to said second waveguide so as to apply voltage across said microcavity  
4 structure.

1 39 (Previously Presented). The microcavity structure of claim 33, wherein said first  
2 waveguide comprises p-doped material and said second waveguide comprises n-doped  
3 material.

1 40 (Previously Presented). The microcavity structure of claim 33, wherein said first  
2 waveguide comprises n-doped material and said second waveguide comprises p-doped  
3 material.

1 41 (Original). The microcavity structure of claim 33 further comprising a mechanism to  
2 provide carrier confinement to the active region by converting the material under  
3 portion of the upper waveguide into an insulator.

1 42 (Original). The microcavity structure of claim 33, wherein at least one of said first  
2 and second waveguides is used to guide light.

1 43 (Original). The microcavity structure of claim 33, wherein at least one of said first  
2 and second waveguides comprises active material used in the generation of photons.

1 44 (Original). The microcavity structure of claim 43, wherein said active material  
2 comprises quantum wells and/or quantum dots.

1 45 (Original). The microcavity structure of claim 42, wherein said first waveguide  
2 guides generated light and said second waveguide comprises active material used in the  
3 generation of photons.

1 46 (Original). The microcavity structure of claim 45, wherein said active material  
2 comprises quantum wells and/or quantum dots.

1 47 (Original). The microcavity structure of claim 45, wherein said first waveguide  
2 comprises p-doped material and said second waveguide comprises n-doped material.

1 48 (Original). The microcavity structure of claim 45, wherein said first waveguide  
2 comprises n-doped material said second waveguide comprises p-doped material.

1 49 (Original). The microcavity structure of claim 42, wherein said second waveguide  
2 guides generated light and said first waveguide comprises active material used in the  
3 generation of photons.

1 50 (Original). The microcavity structure of claim 49, wherein said active material  
2 comprises quantum wells and/or quantum dots.

1 51 (Original). The microcavity structure of claim 49, wherein said first waveguide  
2 comprises p-doped material and said second waveguide comprises n-doped material.

1 52 (Original). The microcavity structure of claim 49, wherein said first waveguide  
2 comprises n-doped material said second waveguide comprises p-doped material.

1 53 (Previously Presented). A method of forming a microcavity structure comprising:  
2 forming a first waveguide including a first photonic crystal microcavity; and  
3 forming a second waveguide including a second photonic crystal microcavity;  
4 and  
5 forming a microcavity active region that is created by overlapping said first  
6 layer and second microcavities, wherein said first waveguide and second waveguide  
7 comprise means for electrical activation.

1 54 (Original). The method of claim 53, wherein the photonic crystal surrounds the  
2 active microcavity region.

1 55 (Currently Amended). The method of claim 53, wherein one or more of the photonic  
2 | crystals ~~are less reflective to~~ define a single or multiple output path of the generated  
3 light.



1 56 (Original). The method of claim 53, wherein the first and second waveguides  
2 provide means for material continuity to achieve the conduction of current to the active  
3 microcavity overlap region.

1 57. (Cancelled)

1 58 (Previously Presented). The method of claim 53 further comprising at least one  
2 contact pad that is coupled to said first waveguide and at least one contact pad that is  
3 coupled to said second waveguide so as to apply voltage across said microcavity  
4 structure.

1 59 (Previously Presented). The method of claim 53, wherein said first waveguide  
2 comprises p-doped material and said second waveguide comprises n-doped material.

1 60 (Previously Presented). The method of claim 53, wherein said first waveguide  
2 comprises n-doped material and said second waveguide comprises p-doped material.

1 61 (Original). The method of claim 53 further comprising a mechanism to provide  
2 carrier confinement to the active region by converting the material under portion of the  
3 upper waveguide into an insulator.

1 62 (Original). The method of claim 53, wherein at least one of said first and second  
2 waveguides is used to guide light.

1 63 (Original). The microcavity structure of claim 53, wherein at least one of said first  
2 and second waveguides comprises active material used in the generation of photons.

1 64 (Original). The microcavity structure of claim 63, wherein said active material  
2 comprises quantum wells and/or quantum dots.

1 65 (Original). The microcavity structure of claim 62, wherein said first waveguide  
2 guides generated light and said second waveguide comprises active material used in the  
3 generation of photons.

1 66 (Original). The method of claim 65, wherein said active material comprises  
2 quantum wells and/or quantum dots.

1 67 (Original). The method of claim 65, wherein said first waveguide comprises p-  
2 doped material and said second waveguide comprises n-doped material.

1 68 (Original). The method of claim 65, wherein said first waveguide comprises n-  
2 doped material said second waveguide comprises p-doped material.

1 69 (Original). The method of claim 62, wherein said second waveguide guides  
2 generated light and said first waveguide comprises active material used in the  
3 generation of photons.

1 70 (Original). The method of claim 69, wherein said active material comprises quantum  
2 wells and/or quantum dots.

1 71 (Original). The method of claim 69, wherein said first waveguide comprises p-  
2 doped material and said second waveguide comprises n-doped material.

1 72 (Original). The method of claim 69, wherein said first waveguide comprises n-  
2 doped material said second waveguide comprises p-doped material.